Jurnal Minfo Polgan
Volume 12, Nomor 2, Januari 2024
DOI : https://doi.org/10.33395/jmp.v12i2.13417
e-ISSN : 2797-3298
p-ISSN : 2089-9424

Terbit : 21 Januari 2024

Optimization Of Livestock Data Management With The Implementation Of Naïve Bayes In The Agricultural Service Information System At The Tomohon City Agriculture Office

[1] Mario Rettob, [2] Vivi Piggie Rantung,
[1, 2] Teknik Informatika Universitas Negeri Manado

[1]Rettobmario28@gmail.com, [2]Vivirantung@unima.ac.id

ABSTRACT

Case Study Research: Optimization of Livestock Data Management with the Implementation of Naïve Bayes in the Information System of the Department of Agriculture in Tomohon City. according to the data this year there was a lot of increase in the livestock sector, especially cattle, which was caused by the high birth rate this year, coupled with data stating that the growth of cattle in the Tomohon area was rapid but under control, with a lot of demand and also the number of births, making the Department want to predict the number of births and the success of cows for the upcoming watku. with the hope that the prediction process produced by the Naive Bayes algorithm is expected to make it easier for the Department to get results that can become predictive data for the future. With the hope that the prediction process produced by the Naive Bayes algorithm is expected to make it easier for the Department to get results that can become predictive data for the future. The study of prediction is one way to know the impact of the development that occurs in cattle in a period of time that can be determined so that a handling plan can be made if there is a spike and cannot be controlled, it can also control the birth rate and production of cows in Tomohon.Changes and predictions that can be made by utilizing existing livestock data can be done using a data analysis program with input data on cow development, cow care and cow gender. The simulation results can show the prediction of birth and also the success of cows..

Keywords: Naive Bayes, prediction, cattle, animal husbandry

INTRODUCTION

The rapid development of technology in the 4.0 era has had a significant impact on almost all aspects of human life. One of the most affected aspects is the use of digital devices, especially computers [1]. The existence of this technology has opened up wide opportunities in terms of expanding access to information. In addition, technology has also changed the way people analyze data, opening up opportunities for tremendous innovation, such as the development of new products, more efficient services. All of these are concrete examples of how technology has become the main foundation in driving positive changes in people's lives, both individually and in the scope of business and society in general.

It should also be noted that in the 4.0 era there are also many employees who prefer to do work through digital devices, especially computers, where we as people who have the ability in the field of technology can utilize this into an innovation that can make an agency more advanced and modern. For example, we develop applications that can be used through computers or laptops.

In this case, the Tomohon City Agriculture Office which is a Government Agency engaged in Agriculture and Animal Husbandry, Animal Husbandry Data Management includes the importance

Jurnal Minfo Polgan
Volume 12, Nomor 2, Januari 2024 e-ISSN : 2797-3298
DOI : https://doi.org/10.33395/jmp.v12i2.13417 p-ISSN : 2089-9424

of animal husbandry data management, the challenges faced, and the implementation of the Naïve Bayes method as a solution. In this context, livestock data management is crucial to improve animal productivity and welfare, but is faced with large data volumes and heterogeneity of data sources. The implementation of Naïve Bayes becomes relevant due to its ability to cope with large datasets and high training speed. Through the application of this method, it is possible to classify important parameters such as animal health and environmental conditions. Thus, optimizing livestock data management aims to improve operational efficiency, reduce the risk of animal diseases, and positively contribute to the sustainability of the livestock sector. The importance of understanding previous research results on the implementation of Naïve Bayes in the context of animal husbandry is also an important part of this background. By detailing the challenges, solutions, and optimization goals, this background provides a strong foundation for the development of research or projects that focus on managing livestock data with a Naïve Bayes approach.

In this context, the naïve bayes algorithm is the chosen solution. As a clustering algorithm, naïve bayes can help manage livestock data by grouping them based on their characteristics. Such clustering allows for more efficient and effective assistance according to the needs of the farmers.

LITERATURE REVIEW

Quality of Service

Balinese cattle are native to Indonesia and are found in a large population with a wide distribution area in Indonesia. The increasing demand for meat and cattle should encourage relevant parties to improve productivity and manage Balinese cattle as well as possible. Balinese cattle have the advantage of adapting to environments that have low quality feed availability, Balinese cattle also have high fertility (Handiwirawan and Subandriyo, 2004). Many communities have developed Balinese cattle for fattening as a source of fertilizer, labor, additional income, savings and employment (Hafid, 2005).

Farmer Success

Farmer Success can be interpreted as a situation where the farm can run well with the appropriate population and market demand with good quality livestock, so that it can make farmers in this case cattle farmers can get maximum and appropriate results, this expectation is part of the management process for the Agriculture and Livestock Service Office which expects appropriate and good results and products.

RESEARCH METHODS

Population and Sample

1. Population

The target population for this study were cattle farmers in Tomohon who could not be certain of the number of births and success of the animals. Therefore, the population was determined based on visits or visits by officers from the Department of Agriculture and Livestock. The record number of farmers in the last 2 weeks at the time of data collection was 250 people who are large-scale farmers.

2. Sample

From these 250 people, sampling was successfully drawn by simple random sampling (this method is used because population members are considered homogeneous or each element of the population provides the same opportunity to be selected as a sample member), so the sample drawn was 60 people.

Hypothesis

The hypothesis proposed for this research is then proven through the Naïve Bayes algorithm using existing data, the data is divided and processed so that there are 3 types of positive and negative neutral data which will be used as samples to test the success of livestock.

Analysis Model Technique

Jurnal Minfo Polgan
Volume 12, Nomor 2, Januari 2024 e-ISSN : 2797-3298
DOI : https://doi.org/10.33395/jmp.v12i2.13417 p-ISSN : 2089-9424

Data Preprocessing The data retrieval process is done using the Tweepy library. This library requires OAuth 1 access which can be obtained through the Twitter Developer website. The use of OAuth 1 in the Tweepy library allows permission to access the available Twitter API. This library uses the search feature from the Twitter API which can search for tweets that match the given keywords." (Romindo, R. (2019) Data crawling is the process of collecting data automatically from various sources such as websites, platforms or documents. Data collected through crawling can be processed and used for various purposes, such as data analysis, information system development or research. Crawling makes it possible to minimize duplication because there is always online content that is duplicated from several websites. Data crawling can be done using API (Application Programming Interface) to collect larger datasets (Shiri, A. (2004). In the context of retrieving data related to animal husbandry, researchers use specific keywords related to relevant animal husbandry. The collected Service data is then stored in CSV format to facilitate further analysis and processing related to the opinions or information contained in the data. Data preprocessing: divided into 5 stages, namely: Data Cleaning In this process, concrete steps are taken to remove characters that can affect the quality of the collected data, such as links or URLs, account names, and signs/symbols. The presence of these characters tends to contribute to the diversity of the text but is not always relevant or useful in sentiment analysis or information related to Animal Husbandry. Tokenizing: Tokenization is an important stage in text processing that aims to break down text documents into smaller sets of words or tokens. The tokenization process is carried out with several steps that include the removal of punctuation marks and the separation of words based on inter-word spaces (Olson & Delen. (2008). Normalization: Normalization is a stage closely related to relational data structures that aims to organize data sets by considering the level of dependence and interrelationships between these data elements. This normalization process aims to produce data sets or data tables that have an organized and well-structured structure, in accordance with the principles of normalization or normal form in the database. Stopword Removal: This stage focuses on the removal of words that are considered non-descriptive or irrelevant in the context of text analysis. This removal is necessary because these words often do not carry any special meaning or significant information in the data representation. The term often used for these words is "stopword" (Baihaqi, W. M., Pinilih, M., & Rohmah, M. (2020). Data Stemming The process in question is the step of removing affixes and suffixes on each token or word in the text. This step uses the Pysastrawi library which is based on the Nazief and Adriani algorithm. The focus of this process is to remove the affixes attached to a word, so that the words are reduced to their basic form (Taufiqurrahman, F., Faraby, S. Al, & Purbolaksono, M. D. (2021). Naïve Bayes is a classification method for calculating probabilities under the condition that the decision class is true. This algorithm assumes that object attributes are independent (Nomleni, P. (2015).

RESULTS AND DISCUSSION

Animal Husbandry Data Collection In research on sentiment analysis of livestock predictions using the naive bayes method. The goal is to find out the classification results between naïve bayes so that later it can be seen which of these methods is more reliable to use in this classification. Application review sentiment labels are classified into negative labels and positive labels. For this research, the data is obtained by crawling or scrapping review data from data from the Department of Agriculture and Animal Husbandry.

After the text preprocessing process applied to 503 farm data, it successfully produced 277 farm data that had been cleaned and adjusted to the needs in the text mining process. In this analysis, the most frequent words were extracted from the 277 farm data that had passed the text preprocessing stage. The results show the most dominant and frequently occurring words in the

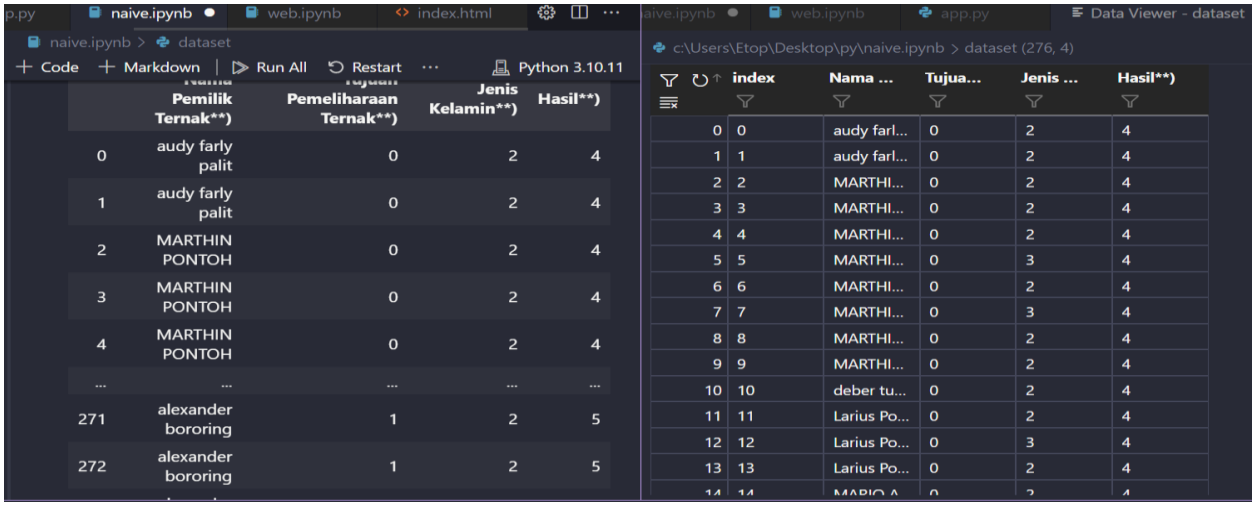
Jurnal Minfo Polgan
Volume 12, Nomor 2, Januari 2024
DOI : https://doi.org/10.33395/jmp.v12i2.13417
e-ISSN : 2797-3298
p-ISSN : 2089-9424

dataset. The following is a word cloud display that illustrates the visualization of the words that appear most often in the 277 clean farm data. This word cloud shows words that have a higher frequency of occurrence with a larger size in the visualization:

Gambar 1 Word Cloud

The visual representation in Figure 1 shows the different word sizes in the word cloud that represent the frequency of occurrence of the words in the livestock data. Larger word sizes indicate that the words have a higher frequency of occurrence in the livestock dataset used. Conversely, a smaller word size indicates a lower frequency of occurrence.

After performing the training set on the livestock data, the next step is to group the livestock data into several sentiment categories based on the results of the sentiment analysis that has been done. The results of this process are then represented in a table that shows the distribution or number classified into each sentiment category.



naive.ipynb > dataset

Code | Markdown | Run All | Restart | Python 3.10.11

	Pemilik Ternak**)	Pemeliharaan Ternak**)	Jenis Kelamin**)	Hasil**)
0	audy farly palit	0	2	4
1	audy farly palit	0	2	4
2	MARTHIN PONTOH	0	2	4
3	MARTHIN PONTOH	0	2	4
4	MARTHIN PONTOH	0	2	4
...	...	...	...	...
271	alexander bororing	1	2	5
272	alexander bororing	1	2	5

Data Viewer - dataset

c:\Users\Etop\Desktop\py\naive.ipynb > dataset (276, 4)

	index	Nama ...	Tujua...	Jenis ...	Hasil**)
0	0	audy farl...	0	2	4
1	1	audy farl...	0	2	4
2	2	MARTHI...	0	2	4
3	3	MARTHI...	0	2	4
4	4	MARTHI...	0	2	4
5	5	MARTHI...	0	3	4
6	6	MARTHI...	0	2	4
7	7	MARTHI...	0	3	4
8	8	MARTHI...	0	2	4
9	9	MARTHI...	0	2	4
10	10	deber tu...	0	2	4
11	11	Larius Po...	0	2	4
12	12	Larius Po...	0	3	4
13	13	Larius Po...	0	2	4

Gambar 2 Klasifikasi Data

After the existing data is studied by the naïve bayes system, the data that researchers input can be processed and tested with test data and training data, with this data management we can see and

Jurnal Minfo Polgan
Volume 12, Nomor 2, Januari 2024
DOI : https://doi.org/10.33395/jmp.v12i2.13417
e-ISSN : 2797-3298
p-ISSN : 2089-9424

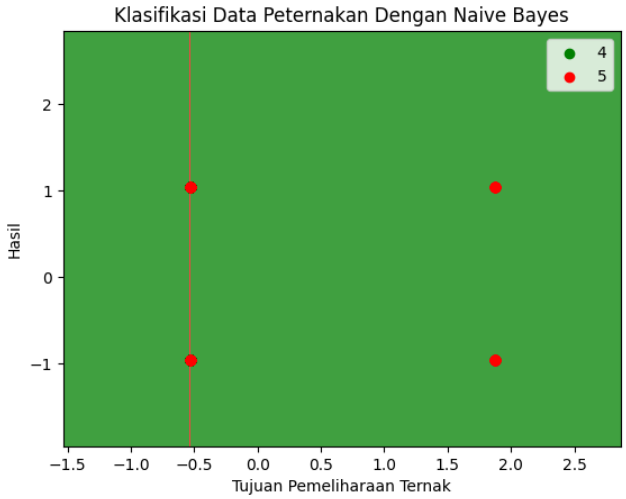
predict the success and failure data with examples:

```
from sklearn.metrics import confusion_matrix
cm = confusion_matrix(y_test, y_pred)
print(cm)
```

```
[52]  ✓ 0.0s
...  [[45  0]
      [14 10]]
```

Gambar 3 Hasil Prediksi Data

Where the result data from x_train, x_test, y_train and y_test can give a prediction of the success rate of birth according to time and cannot also predict the unsuccessfulness of the development of this farm cattle, with a percentage of



Gambar 4 Grafik Prediksi Data

CONCLUSIONS

From this research it can be concluded that by using the naïve bayes method we can classify data accurately and precisely by processing data and predictions with us solid get maximum results as well as precise. Data management at the Department of Agriculture and Animal Husbandry using the Naive Bayes method is that this approach has proven its effectiveness in improving the accuracy of predictions related to food needs, supply, and distribution. By utilizing probabilities and inter-variable dependencies, Naive Bayes helps the Food Service Office make smarter decisions, manage risks, and detect anomalies. Nonetheless, it is important to continue to prioritize data security and privacy as well as pay attention to ethical aspects and regulatory compliance in data management. Overall, the use of the Naive Bayes method provides the agency with a powerful tool to improve efficiency and responsiveness in providing food to the community.

ACKNOWLEDGMENTS

Thank you to our place of service at Universitas Negeri Manado for motivating us and thank you to our dearest family.

Jurnal Minfo Polgan
Volume 12, Nomor 2, Januari 2024 e-ISSN : 2797-3298
DOI : https://doi.org/10.33395/jmp.v12i2.13417 p-ISSN : 2089-9424

REFERENCES

Romindo, R. (2019). Sistem Informasi Pengarsipan Pada Kantor Notaris Efrina Nofiyanti Kayadu, Sh. M. Kn Berbasis Web Dengan Metode Waterfall. REMIK: Riset Dan E-Jurnal Manajemen Informatika Komputer, 3(2), 81-86.

Handiwirawan E, Subandriyo. 2004. Potensi dan Keragaman Sumberdaya Genetik Sapi Bali. Bogor. Buletin Ilmu Peternakan Indonesia. 14(3):107-115.

Shiri, A. (2004). Introduction to modern information retrieval. Library Review, 53(9), 462-463.

Baihaqi, W. M., Pinilih, M., & Rohmah, M. (2020). Kombinasi K-Means dan Support Vector Machine (SVM) untuk Memprediksi Unsur Sara pada Tweet. Jurnal Teknologi Informasi Dan Ilmu Komputer, 7(3), 501–510. https://doi.org/10.25126/jtiik.2020732126

Taufiqurrahman, F., Faraby, S. Al, & Purbolaksono, M. D. (2021). Klasifikasi Teks Multi Label pada Hadis Terjemahan Bahasa Indonesia Menggunakan Chi Square dan SVM. E-Proceeding of Engineering, 8(5), 10650–10659.

Nomleni, P. (2015). Sentiment Analysis Menggunakan Support Vector Machine (Svm). Seminar Nasional Teknologi Dan Komunikasi 2015.Anwar, S. 2009, Pengelolaan Sumber Daya Air, PT. Mediatama Saptakarya Yayasan Badan Penerbit Pekerjaan Umum, Jakarta.

OLSON, David L.; DELEN, Dursun. Advanced data mining techniques. Springer Science & Business Media, 2008.